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## Trends in Maternal and Child Health

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PUBLIC health nurses in Canada have long accepted, as one of their responsibilities, active participation in the provision of adequate maternal and child health services. But it has frequently been difficult to find opportunities to demonstrate what can be done in this field. However, recent evidence of a growing realization of the need for greater emphasis on some aspects of maternal and child health gives encouragement. At Geneva in July, 1948, the World Health Organization, in a resolution adopted by fifty-four nations, stated: "The children of today represent the whole future of humanity. Maternal and child health is a problem of primary importance." This brief review in this area of public health endeavor is offered in the hope that public health nurses may find it helpful in evaluating their activities and in suggesting avenues for action in the future.

In addition to accepting the fact that maternal and child health is of primary importance in a public health program, even before school health and communicable disease control, we see many new developments.

We speak of such things as: "natural childbirth", "painless childbirth", "rooming-in", "self-demand feeding", and "early ambulation", all of which would have been unheard of a few years back.

New relationships in the family are enunciated: "Mother regains her dignity", "Father comes back into the picture", "Babies are human beings".

A new concept of the team of professional workers in this field is being evolved, including the doctors specially qualified by training and experience, the trained nurse-midwife, the public health nurse, the visiting homemaker, and the social worker, nutritionist and physiotherapist.

I use the words "new phrases", "new relationships", fully realizing that

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some intelligent women through the centuries have believed that it is possible to throw off some of the shackles of civilization and be normal healthy females. But it has been largely left to the primitive or untrained mother to demonstrate normal behavior in obstetrics and infant care, while the informed woman, faced with the medical discoveries of the past century, became insecure and afraid. Recently Dr. E. Robertson, speaking to a group of nurses, emphasized the need of the "womanly touch and the maternal instinct" in obstetrics. Perhaps the public health nurse is the catalyst that can bring normal function and medical science together.

If our children are society's most valuable natural resource, then the public health nurse should be prepared to serve the welfare of children as her primary function. With that in mind, we shall take a look at what is happening now and perhaps indicate the trends for the future.

When I was studying in the United States some years ago, I was much impressed with the work of the Tennessee Valley Authority. The infant mortality had been shocking, and the T.V.A. started out to attack this problem, among others.

I visited a shack in the backwoods in Tennessee to see a sick baby on a warm summer day. The air and everything it touched was thick with flies. We brushed them away from a sickly, dehydrated baby and tried to do something for the mother and her child. The mother told us, "I swatted and swatted but the old flies just kept acomin'."

Later, down the valley, we came to another farm house where T.V.A. had been at work. They had accomplished these basic improvements: screens on the windows and doors; a new cement-sided well; a new (and the first they'd ever owned) fly-proof privy. The flies were disappearing, taking with them dysentery and typhoid. Yes, there were the manure piles and garbage dumps, but they could be handled too.

That experience made a lasting impression on me. Whenever I get frantic about my work with problems coming at me in all directions, I remember, and stop to find out if I'm just "swatting and swatting" with the old problems just "keeping on acomin'." If I stop long enough to look over the whole situation, I can usually find some screens to put up, or a root-cause to attack, which will eliminate many of the most persistent problems. Occasionally I find that someone else is clearing up at the source and if I just relax a bit and wait, they disappear, leaving me free to do some of the things in which I can really show progress.

I believe this approach is a sound one in public health in general. Are we, as public health nurses, still at the swatting stage? We're certainly busy and active enough about what we are doing. The Canadian Public Health Association's Study of Public Health Practice in Canada indicates, I believe, how busy and in some instances how ineffectual we have been in many areas of endeavor. For example, there is the fact that we continue to allow the school service to assume a large proportion of time instead of developing a true family health service. Nurses continue to make "defect visits", "absentee visits", "immunization visits", instead of considering the family as a unit. Nurses are trying to meet the problems as they come through the door.

Let us stop and consider what we can do about the root-causes for the

present unhappy state of the public's health; and whether there are any screens we can put up in the meantime. Certainly the problems will keep right on pouring in and settling on us heavily if we relax a minute, but the burden won't seem as heavy if we have to carry it only a short way instead of carrying it indefinitely.

If healthy babies are to be produced and raised, we are now told that we must start with pre-conceptional health. To have healthy babies, we must have healthy parents, and to have healthy adults, we must have healthy children. We must make a start somewhere in this continuing cycle. We help to insure adequate pre-conceptional health by every productive effort of the public health worker, but we need to establish priorities at the roots. We must take measures affecting the production and distribution of food, clothing and housing, measures for the control of employment practices, measures for the provision of medical care for all, measures to extend and strengthen our educational system, our institutions of justice. We need measures to develop the economic and social structure of our society, so that our public health efforts on behalf of children will not be in vain.

I do not mean to say that public health nurses can do much about these root-causes, other than to associate themselves with individuals who are working for social betterment, in such fields as welfare, education, housing, etc.—in other words, to be good citizens. There is ample evidence that in Canada there is a general stirring, and measures *are* being developed that will cultivate the soil in which public health workers can expect to sow the seeds of their scientific knowledge and reap the type of adults that will be suitable candidates for parenthood. In the meantime, what about the screens that public health nurses can put up to protect the mother-to-be and her unborn child?

(1) What of ante-partum and pre-natal care?

In the seven urban districts visited by Miss Lyle Creelman during the study of public health practice, for every 100 births, from 3 to 33 mothers were under public health nursing supervision. In the 10 rural areas, from 9 to 26 mothers received this care. Not a very extensive coverage, is it? Are public health nurses convinced that they have something to offer during the prenatal period? Have public health nurses convinced the doctors, starting first with the medical officer of health, that the nurse has a service to offer which will not replace but rather supplement the job of the family doctor? In places where nurses have known that they can do a job, have sold the idea and carried it out, doctors have been quick to find that team-work in obstetrics gets results in terms of healthy, happy families (father included, which might suggest Parental Welfare as a more modern term than Maternal Welfare, though it might amuse some of our early ancestors).

Prenatal classes, I feel, no longer require testimonials. Yet prenatal classes were conducted in only one of the official agencies included in the Study and one other participated in a joint project in prenatal education sponsored by the welfare council. In one voluntary agency of 105 branches, 22 branches conducted prenatal classes. Yet where else in the whole life cycle is there such an opportunity to prepare for the future of the child and such a readiness to learn on the part of the parents?

(2) What about care during the delivery? This is largely outside the public

health field, except as we accept responsibility to see that facilities are available for care, and that they are used by those who require these services.

I would like to mention, in passing, the question of nurse midwifery. In 1945, the Dominion Council of Health passed a resolution acknowledging that, in certain areas in Canada, doctors are not available for attendance on obstetrical cases and recognizing the value of public health nurses with training in obstetrics for attendance on such cases. The Council endorsed the principle of employing qualified graduate nurses from accredited teaching centres to attend such obstetrical cases. The Canadian Medical Association in October, 1945, and the Canadian Nurses Association in December, 1946, passed similar resolutions.

But women in rural Canada are still having babies without trained attendants, and nurses are still doing their level best without adequate preparation in other areas. Only one province has done anything about this need, and their action came before the blessings.

We apparently are becoming more convinced every day that medical-care plans should see that hospitals are properly placed; that the small hospital is neither efficient nor financially sound—an indication, it would seem to me, that the small health centre which feeds the larger hospital will, for some time to come, have to concern itself, of necessity, with normal childbirth.

Who is to staff this centre? The highly trained doctor who wants to do surgery and desires a laboratory, X-ray equipment, etc., at hand? It seems the answer is "no". Perhaps here the public health nurse with midwifery training would really be doing a productive piece of work, even if she had to be taken away from the doctor's side while he examines school children. Perhaps this is more important than running errands and doing clerical work. Then, too, nurses who have had this training find that they are more effective in each phase of maternal health when they know and understand the whole picture, even if they are never called upon to conduct an emergency delivery.

#### (3) What of post-partum and post-natal care?

The Study indicates that post-partum care in homes is given more extensively by visiting nursing associations than by the official agencies. Where no visiting nursing association exists, the service is undeveloped. But is it not here that we assure women a return to normal healthy family life without obstetric crippling? In 1947 the infant mortality for 1000 live births in Canada was 26.2 under one month of age, and 44.8 under 1 year. Surely the early post-natal period is the time to start saving lives and to start health instruction. Mothers are most receptive to teaching when they come home from hospital with a new baby. Official agencies have been missing a golden opportunity. Most receive birth notices, but in the majority of cases these are not received before the baby is two weeks old, and by the time the nurse gets out to visit, the time when the nursing visit would be most appreciated is past. In only two areas visited by the Study were birth lists obtained directly from the hospital.

#### (4) What of child health?

The organization of child health centres is fairly general across Canada. In some it is questionable whether the mothers come for much more than to have the baby weighed and measured. I also know there are many examples in Canada of successful projects. Certainly there is some sort of continuing super-

vision of the child wherever public health services are provided. In the 7 urban and 10 rural centres visited by the Study, 40 per cent of the total home visits in the urban and 32.7 per cent in the rural areas were to infants and pre-school children.

But in these child health conferences and home visits, are we putting up screens to prevent many of the health problems which now plague us? Are public health nurses prepared for this job? Are adequate facilities provided for them?

The Study asked 35 public health nurses to write down the questions asked by mothers during conferences between mother and nurse in child health centres. The questions came from 280 mothers of infants (under 1 year) and 52 mothers of pre-school children (1 to 5 years). Questions in relation to nutrition were nearly half of the total in the infant group, and over one-quarter in the pre-school group. Questions in relation to mental and emotional development were more numerous in the pre-school group than in the infant group, and were more numerous in the pre-school group than questions on any other aspect. Yet public health nurses have indicated that they feel handicapped by the lack of knowledge of the physical and mental development of the normal child—particularly they expressed the need for more background in mental health. In addition, many state that they feel poorly prepared for the teaching of normal nutrition.

Surely here, the parents' needs and nurse's knowledge must and can be brought into line. The answer lies, of course, in preparation of the nurse for public health nursing and, for those of us already in the field, the establishment of an immediate plan for in-service or staff education to eliminate these deficiencies.

We all know, without the study's telling us so (and it does), that the physical facilities in child health centres are far from perfect. Nurses cannot be expected to do effective teaching and counselling without privacy. We know that mothers are unhappy and insecure when they bring their infants into crowded quarters where there is no place to put their babies' things, no place for the small child to play, and long hours to wait before they are noticed. Surely these are things nurses can be positive about and surely they can fight for the right to have proper facilities so that they can do their job effectively.

We all recognize that we could use more volunteers, and that volunteers are of value only when properly trained and orientated. The Study points out many avenues in this regard for study and action. Might I suggest that the best volunteer for weighing and measuring the baby is the mother herself. How many nurses do this themselves to satisfy their own delight in the babies when they could be teaching the mother how to handle her own baby, observe the mother-child relationship, and have time to answer the mother's questions? But perhaps with that remark, I'm using the swatter too, instead of looking for the screens of "better preparation" and "opportunities for job satisfaction".

#### SUMMARY

I started this paper with a truism that our children are our most valuable natural resource for the kind of future we believe in, and I added another truism

that follows logically, that the primary function of the public health nurse is to promote and preserve the health of children. I suggest that the period in the life cycle which has the greatest long-term results when positively affected is the pre-natal period and that this period, therefore, has first priority, followed by the post-natal and pre-school period, as time and personnel permit. Who controls the right of the public health nurse to select what she will do? I maintain that, indirectly, public health nurses do. If they sincerely believe that they have a real contribution to make to the public's health in this regard, then they can sell the idea to others by the sheer force of their conviction, and by demonstrations that cannot be ignored. If public health nurses now do not feel secure enough in their knowledge and skills to speak out against conditions that keep them from their primary function, then they must demand, of universities and their employers, opportunities to prepare themselves, so that they can face the questioning faces of parents knowing that they, better than anyone else, can give guidance and support.

The swatter or the screen for public health problems?

Surely there are many screens to be found in sound maternal and child-welfare program-planning! Nurses were never ones to sit around and wait for others to do a job when they could see it needed doing. It doesn't take a master architect or a building contractor to put up a screen.

"The children of today represent the whole future of humanity." The World Health Organization is starting its work for the health of the world's children at once, and Miss Creelman, a member of the Canadian Public Health Association, is going to Geneva as Public Health Nursing Consultant of the Maternal and Child Health section. We are very proud that a Canadian has been chosen. Let us demonstrate our pride by an ever-growing concern for the health and welfare of Canada's mothers and children.

References to material from the Canadian Public Health Association's Study of Public Health Practice in Canada were made available through the field staff and have not been published to date.\*

\*The report will be issued on June 10th.—Ed.

# Studies on Poliomyelitis in Ontario\*

## III. FURTHER OBSERVATIONS ON THE ASSOCIATION OF COXSACKIE AND POLIOMYELITIS VIRUSES

### LABORATORY INVESTIGATIONS

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### CLINICAL OBSERVATIONS

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THAT the Coxsackie and poliomyelitis viruses may occur together in pathological specimens, was suggested by Melnick, who recovered both agents from a pool of faecal specimens collected from 6 patients diagnosed as suffering from non-paralytic poliomyelitis in Akron, Ohio, in 1947 (4). About the same time, laboratory investigations were carried out in Cincinnati by Sabin and Steigman on cases of "summer grippé" as well as more typical cases of poliomyelitis. Some strains of poliomyelitis virus of low virulence for monkeys were recovered by these workers from the cases of summer grippé, and strains of high virulence were isolated from the more typical cases (5, 6). Several specimens from this investigation were made available to Melnick, who carried out in his laboratory suitable tests for the presence of Coxsackie virus (3). From 4 patients with summer grippé, poliomyelitis virus was isolated by Sabin from mixed throat swabs and stools; Melnick later recovered Coxsackie virus from the stools of 2 of these patients. In an addendum to Melnick's paper it is stated that poliomyelitis as well as Coxsackie virus has been isolated from the faeces of 4 additional patients, 3 with a paralytic illness and 1 with a non-paralytic attack (3).

Our group of investigators has also reported the presence of both poliomyelitis and Coxsackie viruses in individually collected specimens of stools (1). We have now completed our laboratory investigations on this group of cases in

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Dufferin County, Ontario, as far as is possible, and report on the association of the Coxsackie and poliomyelitis viruses in a total of 6 persons, 5 of whom were close contacts.

#### CLINICAL OBSERVATIONS

The clinical details of these cases have been given in our first report, but are summarized for convenience in the accompanying tables. It will be recalled that the two families "J" and "S" were in close contact for seven days in the "S" home because of quarantine restrictions, a child G. J. having developed signs of bulbar poliomyelitis while driving 150 miles from the "J" home to the "S" home to pay a visit. A close contact (A.O.) of one of the "J" boys was also investigated.

#### LABORATORY INVESTIGATIONS

##### *Technical Methods*

Specimens were collected from all members of the "J" and "S" families and from A.O. Tests were also carried out on L.Y., a resident of Toronto, who was diagnosed clinically as suffering from the Guillain-Barré-Landry syndrome.

Stools were prepared for inoculation in monkeys and mice by high-speed centrifugation, the final "pellet" of deposit being rendered bacteria-free by treatment with ether and antibiotics. Portions of the high-speed deposit were inoculated into the thalami of rhesus monkeys and the brains of suckling mice. The other fractions of the ultracentrifugation were also inoculated in monkeys (by the peritoneal route). The stool extract of L.Y. inoculated in a monkey was prepared by repeated shaking with ether. Monkeys were killed on the first day of paralysis or after four weeks, and examined histologically. Mice were sacrificed at the first sign of infection, and the brain and skeletal muscles examined histologically. Throat washings were simply treated with antibiotics prior to inoculation in monkeys.

Adequate samples of blood serum were only available from G.J., the child with bulbar involvement, and L.Y., and these were examined for evidence of virus neutralizing antibody. Each sample of undiluted serum was mixed with an equal quantity of Coxsackie virus suspension (suckling mouse tissue) and inoculated intracerebrally (0.03 ml amounts) in a litter of 4-day-old suckling mice. Each mouse received at least 1,000 LD<sub>50</sub> of virus.

#### RESULTS

The results of the examination of the stools of the "J" family and A.O., a close contact of B.J., are presented in Table I. It will be seen that both Coxsackie and poliomyelitis viruses were recovered from individual stool specimens of B.J., D.J., Mr. J., and A.O. The Coxsackie virus alone was recovered from Mrs. J.

The results of the examination of stools and throat secretions of the "S" family are given in Table II. The parents were evidently not excreting either virus when tested on two occasions within nine days of the first exposure to infection from the "J" family. However, the daughter (R.S.) was found to be

TABLE I  
EXAMINATION OF THE "J" FAMILY FOR POLIOMYELITIS AND COXSACKIE VIRUSES

Initials of Family Member	Clinical Notes	Date of Collection of Stools	Result of Inoculation of Stools*	
			In Monkeys (for poliomyelitis virus)	In Mice (for Coxsackie virus)
B.J. (male, 2 years)	Aug. 11 to 13: vomiting, diarrhoea, and fever Aug. 25: transient irritability.	Aug. 25 and 31 (pooled)	No. 604 +	+
		Aug. 25	No. 703 +	+
		Aug. 31	No. 638 +	+
D.J. (male, 6 months)	Aug. 11 to 13: vomiting, diarrhoea, and fever; no further sickness.	Aug. 25 and 31 (pooled)	No. 593 +	+
		Aug. 25	No. 639 +	+
		Aug. 31	No. 701, non-specific death	+
Mr. J.	No sickness.	Aug. 25	No. 646 +	+
Mrs. J.	Aug. 15: felt mildly unwell.	Aug. 25	No. 644, non-specific death	+
		Aug. 31	No. 702 -	-
A.O. (female, 6 years)	Sept. 3: played with B.J. Sept. 12 to 14: "meningeal irritation."	Sept. 14	No. 589 +	+

\*+ sign indicates finding of changes histologically typical of poliomyelitis or Coxsackie infection; - sign indicates absence of such changes.

TABLE II  
EXAMINATION OF THE "S" FAMILY FOR POLIOMYELITIS AND COXSACKIE VIRUSES

Initials of Family Member	Clinical Notes	Date of Collection of Specimens	Result of Inoculation of Stools		Result of Inoculation of Throat Secretions in Monkeys
			In Monkeys	In Mice	
R.S. (female, 24 years)	Aug. 23 - 30: quarantined in home with "J" family. Sept. 4 - 6: fever, headache, vomiting, constipation.	Aug. 25	No. 630 + No. 709 -	-	No. 623 -
		Aug. 31	No. 632 -	-	No. 624 -
		Sept. 14	No. 629 - No. 710 -	+	
Mr. and Mrs. S. (test of pooled samples)	No sickness.	Aug. 25	No. 631 -		No. 621 -
		Aug. 31	No. 628 -		No. 622 -
Mr. S. (test of individual samples)		Aug. 25		-	
		Sept. 1		-	
Mrs. S. (test of individual samples)		Aug. 25		-	
		Sept. 1		-	

excreting poliomyelitis virus in the stool two days after first exposure to infection, and the Coxsackie virus at a later date.

From Table III it will be evident that the stools of L.Y. contained both poliomyelitis and Coxsackie viruses.

TABLE III  
EXAMINATION OF L.Y. FOR POLIOMYELITIS AND COXSACKIE VIRUSES

Clinical Notes	Date of Collection of Stools	Method of Preparation of Stool Extracts	Result of Inoculation of Stools	
			In a Monkey	In Suckling Mice
July 23: developed ascending paralysis; after a serious illness, made an unexpectedly rapid recovery and was well by November.	July 27, 28 and 29	Ether-treatment for extract inoculated in monkeys; centrifugation for extract inoculated in mice.	No. 708+	+

In Table IV are shown the results of the virus neutralization tests carried out with the sera of G.J. and L.Y. It is very interesting to find that neither the acute nor the convalescent sera of G.J. neutralized the virus, whereas the results in the case of L.Y. suggest the development of a rise in antibody titre in convalescence.

TABLE IV  
VIRUS NEUTRALIZATION TESTS FOR COXSACKIE INFECTION

Initials of Case	Clinical Notes	Date of Collection of Serum	Result of Inoculation of Mice with Serum-Virus Mixtures*	Conclusions
G.J.	Aug. 18 - 23: pre-paralytic phase; Aug. 23: bulbar paralysis.	Aug. 31 (2 weeks after onset)	7/8 mice showed evidence of Coxsackie infection	No Coxsackie antibody.
		Oct. 3 (7 weeks after onset)	9/9 mice showed evidence of Coxsackie infection	No Coxsackie antibody.
L.Y.	July 23: developed ascending paralysis.	July 27 (4 days after onset)	3/8 mice showed evidence of Coxsackie infection	Some Coxsackie antibody present.
		Sept. 1 (7 weeks after onset)	9/9 mice remained healthy	A larger amount of Coxsackie antibody present.
		Oct. 20 (14 weeks after onset)	9/9 mice remained healthy	

\*Serum used undiluted; final dose of virus in 0.03 ml inoculum > 1000 LD<sub>50</sub>.

#### DISCUSSION

Our findings make it evident that the Coxsackie and poliomyelitis viruses may both be isolated at the same time from individual stool samples. The Coxsackie virus appears to disseminate in families in the same way as does poliomyelitis virus. Clearly, no laboratory diagnosis of poliomyelitis-like infections can be

made merely by inoculation of stools in suckling mice, and any hopes that diagnostic problems have been simplified by the discovery of the Cocksackie virus are unjustified. The thorough investigation of such cases still requires the inoculation of monkeys.

Although there is no doubt of the pathogenicity of the Cocksackie virus for man, it is not easy in our series to decide whether the clinical manifestations were due to infection with Cocksackie or poliomyelitis virus, and we shall discuss the various cases in order.

The boy G.J., with bulbar paralysis, seems to have been infected only with poliomyelitis virus, as his serum did not develop antibodies to Cocksackie virus in convalescence. The Cocksackie virus was probably responsible for the transient attack of vomiting, diarrhoea, and pyrexia in B.J. and D. J. on August 11th, and for the mild illness of their mother four days later. If this is correct, it would seem that the Cocksackie virus may be excreted in the stool for at least three weeks after onset of the illness. It is interesting to note that D.J., aged only 6 months, was found to be excreting poliomyelitis virus on two occasions in the apparent absence of any clinical evidence of infection with this virus.

The case of Mr. J. indicates that Cocksackie virus may be excreted by symptomless adult carriers.

The "meningeal irritation" shown by A.O. may have been caused by the Cocksackie or by the poliomyelitis virus. It is of interest that she had contact with B.J. on one day only, and that her illness developed nine days later.

Of particular interest is the case of R.S. As far as is known, this young woman had not been in contact with poliomyelitis prior to the visit of the "J" family, but she was found to be excreting poliomyelitis virus in her stool on August 25th, two days after the arrival on August 23rd of the "J" family who at this time were almost certainly discharging Cocksackie and poliomyelitis viruses in their stools. The amount of virus excreted by R.S. was probably small, as only 1 of 2 monkeys contracted poliomyelitis. Poliomyelitis virus was not found again in her stools, but Cocksackie virus was isolated ten days after the development of an abortive illness. Poliomyelitis virus was not recovered from her throat secretions. It may be postulated that the small amount of poliomyelitis virus isolated on August 25th represented inhaled or ingested virus that for some reason did not establish itself significantly in the pharyngeal or intestinal wall, and by August 31st had all been discharged. We may attribute the abortive illness of September 4th to the Cocksackie virus alone. Had the sickness been due to poliomyelitis, one would have expected the recovery of virus from the stools collected on September 14th, especially as 2 monkeys were inoculated with extract concentrated in the ultracentrifuge.

The case of R.S. is pertinent to consideration of the pathological condition in healthy faecal carriers of poliomyelitis virus, who are most commonly to be found in the families of persons suffering from a clinically recognizable attack. It is generally believed that in such healthy persons the virus proliferates in the wall of the gastro-intestinal tract and is excreted for several days or longer in the faeces. For some reason, there is no clinical evidence of invasion of the rest of the body. R.S. would appear to represent a variety of healthy carrier in whom after entering the body by inhalation or by ingestion, the virus fails to

establish itself in the tissues and is at once discharged in the faeces. Such persons would be infective for only a very short time after exposure, but nevertheless could play a part in the dissemination of infection. Such an explanation may account for instances where persons seem to have disseminated infection shortly after exposure, several days before the end of the usual incubation period, and at a time when it is unlikely that any significant viral multiplication could have occurred. For example, in the Mauritius outbreak in 1945 the evidence suggested spread by healthy adults infected for a short time only (2).

Finally, we may discuss the case of L.Y., from the stool of whom both viruses were recovered. The result of the virus neutralization test suggests that the Coxsackie virus was proliferating in some body tissue sufficiently actively to stimulate the development of antibodies. There is no evidence available on which to judge whether the nervous illness was caused by the poliomyelitis virus alone, the Coxsackie virus alone, or perhaps by the two acting together. It can be said, however, that the rapid recovery from a complete paralysis of all limbs and of some muscles innervated from the medulla was quite unusual for poliomyelitis.

#### SUMMARY

1. A preliminary report on the association of the poliomyelitis and Coxsackie viruses in persons studied in Dufferin County, Ontario, has now been extended.

2. It is reported that both viruses have been isolated from the individually collected stools of 3 children and 1 adult who were in close contact.

3. In an additional contact the Coxsackie virus alone was recovered from the stool.

4. From the stool of another member of this family group, both viruses were recovered, poliomyelitis virus two days after the first probable exposure to infection, and the Coxsackie virus several days later, following an abortive type of illness.

5. It is suggested that this person is representative of healthy carriers who excrete virus in the stool shortly after infection only. Transient carriage of this type could explain some reported aspects of the epidemiology of poliomyelitis.

6. From the stools of a child living in another part of Ontario, and suffering from an acute ascending paralysis of the Guillain-Barré-Landry type, both the poliomyelitis and Coxsackie viruses were recovered. The results of virus neutralization tests suggested the development of a rise in antibody titre to Coxsackie virus in convalescence.

7. In all, therefore, the association of Coxsackie and poliomyelitis viruses has been demonstrated in individual stool samples of 4 children and 1 adult. An additional adult excreted the two viruses, isolations being made from stools collected at an interval of three weeks.

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## Social and Preventive Medicine in the Training of the General Practitioner

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THOSE of us in the field of health administration must be concerned about medical education, particularly in the training of general practitioners. There are two reasons for this. First, our experience shows that a background of general practice is most desirable for medical personnel in public health. Second, with the rapid increase in the establishment of full-time health departments all across Canada, partly as a result of the availability of federal funds for this purpose, more and more of the routine work in the preventive field should and will be done by the general practitioner.

At a luncheon address to the New Brunswick Medical Society some three weeks ago, Sir Lionel Whitby, past president of the British Medical Association, was quite frank in stating that, in his opinion, prepaid medical care was inevitable in any civilized country. With the changing trend in the methods of providing medical care and the likelihood that we shall have health insurance, in whole or in part, sooner or later, it is more imperative than ever that the content of the medical curriculum be carefully considered to ensure that new graduates as general practitioners have been given the training required to perform the important tasks that are likely to be the responsibility of a new generation of medical personnel in a new method of providing medical care.

I am probably the least-well qualified person of this group to discuss medical education. However, after twenty years as a health administrator, I do appreciate my own shortcomings and those of my confrères, and have some idea as to what was lacking in our own medical education that makes our efforts, and those of general practitioners, of less value to the communities and patients we try to serve than they should be.

The objectives of training in social and preventive medicine should be:

1. To gather under one head all subjects having to do with the medical man's duties to, and relationship with, the community in which he might practise.
2. To widen the student's outlook on the social aspects of medicine and the consideration of the patient's environment (and I use this term in its broadest sense) in relation to his illness, and
3. To "infiltrate" the teaching of preventive medicine through the whole

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medical course in order that it may become a part of the student's training as a physician, rather than a subject he must take in order to obtain a licence to practise.

To reach these objectives, I think that consideration should first be given to the pre-medical educational requirements. For many years in Manitoba I had the direct responsibility of administering the welfare program of that Province and, as the years went by, became more and more convinced that every medical graduate should have at least some knowledge of the basic things in social work. Health and welfare cannot be separated. This implies instruction in the social sciences, and it seemed to me that these might be required in the pre-medical instruction. Sometime ago, in going over the report of a conference on preventive medicine and health economics, held in Ann Arbor in the fall of 1946, I noted in a report of a subcommittee the following recommendation:

"That the Association of American Medical Colleges be strongly urged by a formal communication from this conference to recommend to all medical schools that they require instruction in the social sciences (sociology, economics, government and psychology) as prerequisites to admission; at the sacrifice, if necessary, of some of the present requirements; and that this change be instituted as soon as possible."

When it comes to the medical curriculum itself, I think the properly trained general practitioner—and I am most concerned with those going into rural practice—should be so instructed that he can take over the medical duties that now are performed by organized health departments and that rightly belong to the family physician. Disease prevention and health preservation must be the coordinating features throughout the whole medical course. This requires someone on the faculty to see that this coordination is achieved. The full-time professor of social and preventive medicine would seem to be the logical coordinator, because of necessity he must have constant contact with all departments of the faculty besides many outside connections with the public and public authorities, particularly in respect to the preventive aspects of medical practice.

It would naturally follow that the new graduate must be well trained in obstetrics and have an adequate knowledge of paediatrics. It is in these two fields that prevention pays the biggest dividends. He should also be an efficient diagnostician and be able to decide, with the sometimes limited facilities that may be available to him, whether or not a patient should be referred to a specialist. More emphasis should be given to the treatment of minor accidents and common complaints, as well as the psychological aspects of medical practice.

But instruction in the medical school and the teaching hospital, even with a complete reorientation, is not enough. The student should have actual experience in rural practice. This can best be obtained by medical apprenticeships with outstanding private rural practitioners and experience in rural general hospitals and health centres or doctors' workshops. Such training is essential if we are going to dispel the very common fear or disinclination of the new graduate to enter rural general practice. I believe it should be part of the intern requirement. Rural orientation should also include participation in the work of a full-time health unit in order that the new practitioner can gain actual experience in

disease prevention. The greatest advantage of this type of extra training would be the knowledge that the prospective graduate would obtain of people living in their normal environment—something he could never get by spending all his internship in a large teaching hospital.

I do not think I am competent to outline in detail the subjects that should be contained in a well-rounded course in social and preventive medicine. These are set out in some detail by the Committee on Curriculum Planning of the conference at Ann Arbor, mentioned previously. One would think that it would be very desirable that considerable emphasis should be given to so-called medical economics. The most important thing we have to try and accomplish, however, is to make the student consider the patient as a person who lives and works and plays or gets sick, just as the prospective doctor does. Just how well he lives or works or plays, and how little he gets sick, depends to a very considerable extent on his social environment.

I think the attitude we should try to instil in all general practitioners can best be illustrated by reading part of a social history presented by one of the fourth-year students in Manitoba some three years ago. It reads in part as follows:

"It is the opinion of the writer that, while the social problems arising from delinquency, criminal tendencies, mental deficiency, and gross physical handicaps, are all important, yet it is of even greater importance to solve first the social problems arising as a result of minor handicaps or inadequacies, or misadventure on the part of people who are fundamentally good and useful citizens. The history of this patient indicates that he has been reasonably thrifty and industrious, and that he has had no especial difficulty in getting along with his associates and that he has no abnormalities of outlook or development which might have brought him into conflict with society or the law. Hence the social and preventive implications of such a case appeal to the writer as being indicative of aspects of our medical and social welfare arrangements most capable of improvement.

"Regardless of whose responsibility it may be, the fact remains that a minimum income is necessary for the preservation of life and health. That amount is not represented by an income of \$29.17 per month. It is obvious that the patient remained alive on it, but it is within the realm of possibility that the standard of living it provided has some bearing on the fact that he contracted tuberculosis. In this case, there is no history of hereditary or contact factors, and thus debility and malnutrition may underlie the decreased resistance to infection."

In order to insure continued good service to the public by the general practitioner, I believe that we must go even further than the actual training, and take a look at our present method of medical licensure. When a young man graduates from medicine, he gets two things: a licence to practise medicine in all its branches, and a licence that lasts as long as the physician may live, provided he operates within the law and pays his yearly dues to the licensing authority.

I am of the opinion that careful consideration must be given to whether or not an unlimited licence should be issued to any graduate in medicine. Such a procedure may have been necessary twenty-five or fifty years ago when travel facilities were difficult and specialists few and far between; but in this day and age these two difficulties, even in our rural areas, are not so important. Certainly, it is not fair to the new graduate, let alone the public, to place upon him the responsibility vested in such a licence.

A licence for such an important thing as the care of the physical and mental well-being of humanity should not remain valid for an unlimited length of time without some periodic evaluation of the quality of the work performed by the individual who holds the licence, to make sure that he is providing a satisfactory type of service. Other forms of business that have a bearing on the health of our people are under constant supervision by competent authorities and require a yearly renewal of licence. Such things as milk production and restaurant operation may be cited. On Wednesday of this week in Toronto, I was informed that in Ontario embalmers have to take a refresher course every five years in order to renew their licence. It would seem that some method should be established by our medical licensing authorities to insure that as long as a medical man is permitted to practise, he is competent to provide good medical care for his patients.

In conclusion, I believe that medical educators have two responsibilities: first, to the public, to insure that every graduate will be able to provide for his patients good medical care, with particular emphasis on the prevention of disease and the promotion of health; and second, to the student, to provide the kind of instruction that will give him a true social outlook on medical practice and life in general, in order that he will be a useful citizen in the community in which he lives, as well as a good practitioner.

## Some Comments on Nutrition Education

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AT a meeting such as this there is no need to reiterate the importance of nutrition in attaining good health. We, as well as other national and international groups, have followed the progress of this science with interest and are watching for further developments in the field.

A great deal of scientific knowledge has been accumulated. We realize, however, that we must discover how to bring about the practical application of this information before we can hope to relieve the conditions which accompany malnutrition. To bring about the application of this knowledge necessitates the careful consideration of the nutrition problems of the people with whom we are working and of the many related social and economic factors. It requires also the study of our educational methods.

Nutrition is a new science. Nutrition education is one of the most recently developed aspects of this science. We have not had time to find out yet the best methods of teaching others that which has been established as fact.

Certain experimental work in nutrition education has centered upon the stimulation of interest in attacking nutrition problems, while other work has directed attention to the development of programs for the home, the school, or the community; to the training of leaders to guide the program; or to the evaluation of the program itself. Through these studies we have found that certain techniques and materials are of value in getting people to carry out the principles of nutrition.

There is need, however, for more complete programs which will include a determination of nutritional needs, a resolution of the conditions which reasonably may be expected to be improved, and the development of an educational program which will serve as a guide in solving the problems. Such a program must be planned for a particular situation because it is only through detailed study that we can find out "what will work" for that group at that time.

We have a great responsibility when we undertake to change people's food habits. We must proceed in a democratic fashion to help individuals solve their own problems and satisfy their real needs. Therefore, the nutrition

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education program must be thought of as a community, home, and school program and be co-operatively planned, conducted, and evaluated by the individuals concerned.

In different localities there will be greater emphasis placed on one aspect of the program than on another. Regardless of the main approach to the program, it is important that nutrition education reach all members of the community so that they support the program and assist in establishing an environment favourable to the development of satisfactory food habits.

It is essential to know the point of view of members of the community in order to approach problems wisely. For example, in many communities, adults feel that "the food which their parents ate is good enough for them." It would be necessary to show this group that the food supply has changed greatly in the last few years. Food has been prepared and processed in ways that present problems which their ancestors did not have.

We must know the food habits of the people and the composition of their common, inexpensive foods so that we stress a few facts rather than attack the entire food pattern. As there is a trend in some communities to follow food fads and accept certain food fallacies, it is most important to present well-established scientific facts.

Although it is known that people are reached best in a personal way by individual instruction, group instruction is used in order that larger numbers will be assisted. Instruction should be suited, however, to the intelligence, experience, needs, and interests of the groups. It is well to remember that group decision produces greater results than can be obtained from either group discussion or authoritarian statements made by a leader.

It is essential that the persons who control the channels of the food supply and the diet be members of the group. For example, in certain districts, it will be important to hold meetings with fathers because they hold the purse strings and make decisions about food.

Education in nutrition is best accomplished, however, by concentrating on nutrition education in the school because the basis of long-term improvement of nutrition status lies with children.

It has been stated that "the first aim of our schools is to develop young Canadians sound in mind and body."\* For this reason, a health program which includes both health services and health teaching is an essential part of the school program. Education in nutrition is a vital part of this health program.

Nutrition education must become a part of the curriculum of the entire school. It must include consideration of the school environment and such phases of school life as the school lunch. It must include co-operation with parents and the community.

Nutrition education is essential for all pupils of all ages. It is important in the elementary grades because food habits are established during childhood and because practically all children attend the elementary school. It is important in the secondary school because it is at this age that young

\*Report of the Canada and Newfoundland Education Association (now the Canadian Education Association), 1943.

people are most apt to neglect their health. Physical examinations show that students in the secondary school have worse states of malnutrition, more skin disorders, and a greater tendency to other conditions associated with poor nutrition than children in the elementary school. In addition, accelerated growth and physiological changes place a great emphasis on the need for good nutrition during this period.

A committee representing students, teachers, school administrators, health personnel, and parents should assist with the promotion and development of the nutrition education program in the school and with its subsequent modification.

It is the teacher, however, who is responsible for instructing students in regard to foods. For this reason, it is most important that the teacher have adequate knowledge of the subject matter of nutrition. Health personnel must assist the teacher in acquiring this information and in guiding the program.

It is important that specialists and parents working with the teacher have an understanding of the accepted theory of learning, the length of time required for learning, the experiences which motivate learning, and the beliefs and practices of the schools of that area. Well-qualified, experienced teachers have learned how to educate and can provide us with many helpful suggestions as to how to make nutrition education "take" so that behaviour will be influenced.

A great deal of co-operative work must be done by members of the home, the school, and the community before we can hope to develop a generation with sound nutrition habits. We must begin from where we now are and proceed realistically towards our goal.

# Streptomycin Resistance of *Mycobacterium Tuberculosis* and its Determination by Means of Oleic Acid—Albumin Agar\*

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THE great importance which streptomycin therapy has assumed in the treatment of human tuberculosis has focussed attention on the problem of streptomycin resistance. Since Youmans and his associates (1) first succeeded in 1946 in producing a streptomycin-resistant variant of *Mycobacterium tuberculosis* by *in vitro* contact of the culture with streptomycin, the frequent development of a similar drug resistance in the course of prolonged streptomycin therapy of human tuberculosis has been reported by many investigators.

Although the clinical significance of the appearance of streptomycin-resistant strains awaits clarification, the *in vitro* determination of streptomycin resistance of *M. tuberculosis* must nevertheless be considered a test of primary importance.

The method of measuring streptomycin resistance by growing the tubercle bacillus in fluid tween-albumin medium (2) containing graded amounts of streptomycin, proves satisfactory for determining a more or less marked degree of resistance. However, the presence of only a few drug-resistant cells in an otherwise streptomycin-sensitive culture may readily escape observation (3). Pyle (4) was the first to demonstrate the advantage of using a solid medium for testing cultures of *M. tuberculosis* for the presence of cells with increased drug resistance. Herrold's egg-yolk agar medium recommended by Pyle for this purpose was subsequently used by Williston and Youmans (5), Youmans et al. (6), and Anderson and Smith (7) for further studies on streptomycin resistance in pulmonary tuberculosis.

In a recent investigation (8) dealing with the presence of cells with increased streptomycin resistance in otherwise sensitive cultures of *M. tuberculosis*, we determined streptomycin resistance by using:

- (a) tween-albumin fluid medium\*\* and
- (b) solid oleic acid—albumin agar,

the latter medium having been proposed by Dubos and Middlebrook (2) for primary isolation of the tubercle bacillus.

The main purpose of the present communication is to draw attention to

\*This study is part of an investigation on chemotherapy of experimental tuberculosis, carried out with the financial aid of the National Research Council of Canada.

†With the technical assistance of W. H. Linklater and R. Otulakowski.

\*\*Containing 0.05 per cent "Tween 80" and 0.35 per cent Bovine Plasma, Fraction V.

the technical advantage offered by the use of oleic acid—albumin agar\* as a translucent medium permitting early and easy detection of colonies of *M. tuberculosis* derived from streptomycin-resistant cells.

#### *Composition of Oleic Acid—Albumin Agar\*\**

Based essentially on Dubos and Middlebrook's formula (2), the medium used for our experiments is constituted as shown in the table. The autoclaved basal medium, containing the agar, is cooled to 45°C. before adding the desired amount of streptomycin sulphate, along with the oleic acid—albumin complex. The agar slants are poured, using 1-oz. rectangular medicine vials with screw caps. The usable agar surface is 3 x 6 cm. In our experience such vials give better protection to the medium against drying than sealed Petri dishes. When prepared with the necessary care, the oleic acid—albumin agar is clear, readily permitting observation of colonial growth by means of indirect transmittent light.

The incorporation of the following concentrations of streptomycin was found useful: 0, 0.5, 1, 10 and 100 micrograms per ml. of medium. For special purposes any desired concentration of the antibiotic may be prepared.

#### OLEIC ACID-ALBUMIN AGAR

(Dubos and Middlebrook)

<i>Ingredients</i>	<i>Percent*</i>
KH <sub>2</sub> PO <sub>4</sub>	0.1
Na <sub>2</sub> HPO <sub>4</sub> , 12H <sub>2</sub> O	0.63
Asparagin	0.1
Enzymatic Digest of Casein	0.2
Ferric Ammonium Citrate	0.005
MgSO <sub>4</sub> , 7H <sub>2</sub> O	0.001
CaCl <sub>2</sub>	0.00005
ZnSO <sub>4</sub>	0.00001
CuSO <sub>4</sub>	0.00001
Adjust pH to 6.5 - 6.8	
Bacto Agar	1.5
Oleic acid	0.005
Bovine plasma, Fraction V	0.5
NaCl	0.85
Streptomycin sulphate (desired amount added)	

\*Grams in 100 ml. of medium.

#### *Technique of Seeding*

From a culture of primary isolation, grown on Loewenstein-Jensen medium (10) or on oleic acid—albumin agar, a subculture is made by grinding one or several colonies in a special tube†. This consists of a Pyrex test tube (5" x 1/2") and a glass rod. The lower end of the rod has the shape of a round knob with a ground surface to fit the ground glass bottom of the test tube. After grinding the colony in the presence of a minimum of Dubos (tween-albumin)

\*A first demonstration of the usefulness of this medium for determining streptomycin resistance was made at the Christmas meeting, 1949, of the Laboratory Section, Canadian Public Health Association (9).

\*\*This medium was prepared by Miss G. S. Slinn, Media Department, Connaught Medical Research Laboratories.

†For information regarding the use of these tubes the author is indebted to Dr. Marion Ross, Sunnybrook Hospital, Toronto (11).

fluid medium, a fine, even suspension is prepared by further addition of 1 ml. of Dubos medium. From this suspension 0.05 - 0.1 ml. is used for seeding 5 ml. of Dubos medium. This fluid culture is incubated for 7 to 10 days (38-39°C.) until the turbidity determined in a Klett-Sommerson Photoelectric Colorimeter (green filter No. 54) corresponds to a scale reading of approximately 60. The purity of this culture is verified by seeding 0.1 ml. into 5 ml. of nutrient broth, which has to remain clear on incubation. A five-fold dilution of the culture in Dubos medium is used for determining streptomycin resistance, taking for each oleic acid-albumin agar slope 2 inocula, seeded with a 5 mm. platinum loop, spreading the material evenly over the whole agar surface.

As an alternative, the primary isolation of the tubercle bacillus from sputum by means of oleic acid-albumin agar and the determination of streptomycin resistance can be effected simultaneously in one operation by applying the technique described by Smith et al. (12) for primary isolation, using penicillin for preventing the growth of contaminants.

In our experiments, recorded here, streptomycin resistance was determined using for seeding of the oleic acid-albumin agar the fluid Dubos culture as described above. Growth in the form of very small colonies generally appears after 7 days' incubation (38-39°C.). Final readings are made after 6 weeks.

#### *Partial Resistance of M. tuberculosis to Streptomycin*

As an example of the use of this translucent medium, Fig. 1 shows the growth of a partially streptomycin-resistant culture\* of *M. tuberculosis* isolated from a human case of tuberculosis subsequent to streptomycin therapy.

The original strain, isolated prior to the institution of streptomycin treatment, grew freely on oleic acid-albumin agar in the absence of streptomycin but was completely inhibited by one microgram per ml. of the antibiotic. In fluid tween-albumin medium the minimum bacteriostatic concentration was 0.2 microgram of streptomycin per ml.

As shown in Fig. 1, the culture isolated after streptomycin therapy, grew abundantly in the absence of streptomycin as well as in the presence of one microgram of the antibiotic. Only a few colonies developed in the vial containing 10 micrograms of the drug. In tween-albumin fluid medium the culture grew in the presence of one microgram, no growth occurring with 2 micrograms of streptomycin.

When judged by the growth on oleic acid-albumin agar (Fig. 1), the streptomycin resistance of this culture was only partial in the following respects: 1) the drug resistance was not evident above a certain streptomycin level (10 micrograms per ml.); 2) not all cells of the culture showed the same degree of limited drug resistance. At the 10 microgram-level a few colonies developed whereas the large majority of the inoculated cells were inhibited.

It is of special interest to note that despite the relatively low degree of *in vitro* streptomycin resistance, this culture produced an experimental infection in guinea pigs which did not respond to extensive streptomycin therapy (subcutaneous injection of 6,000 micrograms daily), whereas the experimental in-

\*Obtained through the courtesy of Dr. G. P. Youmans of The Medical School, Northwestern University, Chicago.



Growth of *M. tuberculosis* (strain 913) seeded on Oleic Acid-Albumin Agar, containing 0, 1, 10 and 100 micrograms of Streptomycin per ml. Photograph (by Clifford Smith) taken after 6 weeks' incubation.

fection induced by the original strain, isolated from the same patient previous to streptomycin therapy, readily responded to the same treatment.

#### DISCUSSION

Feldman et al. (16) have shown that the experimental guinea pig infection, caused by a strain of high *in vitro* resistance, is refractive to streptomycin therapy. Our above-mentioned animal experiments (to be presented *in extenso* elsewhere) indicate that even a low degree of *in vitro* streptomycin resistance may be of biological significance. This emphasizes the necessity of testing cultures by using a wide range of streptomycin concentrations in order to facilitate detection of low-grade streptomycin resistance. The *in vitro* tests described demonstrate the superiority of a solid substrate over a fluid medium for detecting this type of streptomycin resistance.

Armstrong and Walker (13) have shown that the occurrence of streptomycin-resistant variants of *M. tuberculosis* does not exclude the simultaneous presence in the same patient of fully drug-sensitive cells. In one and the same culture tube, colonies grown from sensitive cells may be found side by side with colonies derived from resistant cells. The detection of streptomycin-resistant colonies, therefore, does not by itself justify discontinuance of streptomycin therapy, though it should be taken as a definite warning that with continued treatment the antibiotic may gradually lose its clinical effectiveness.

In the case of recently admitted tuberculous patients, the early detection of streptomycin-resistant strains is of particular importance, since streptomycin resistance occurring prior to the commencement of streptomycin therapy would

indicate that the infection was contracted from a source harbouring a streptomycin-resistant strain. That this type of infection actually does occur is confirmed by recent clinical reports (14, 15). This form of infection represents the clinical counterpart of the above described experimental infection in guinea pigs, induced by means of a streptomycin-resistant strain of *M. tuberculosis*. If the results of our animal experiments are taken as an indication, there is no ground for optimism regarding the clinical effectiveness of streptomycin in cases showing this particular form of infection.

#### CONCLUSIONS

In reviewing various techniques for determining streptomycin-resistance of *M. tuberculosis*, the advantages offered by the use of a solid medium in the form of oleic acid—albumin agar are pointed out. As a translucent substrate of well-defined chemical composition, oleic acid—albumin agar permits easy and early detection of colonies derived from drug-resistant cells.

As an example of the use of this medium, the partial streptomycin resistance of a human strain of *M. tuberculosis* is demonstrated. The biological significance of this and other forms of streptomycin resistance is discussed.

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## Nitrate Content in Well Waters

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A NUMBER of recent publications have brought into prominence the effects of the nitrate content of well waters used in feeding infants (1, 2, 3). The number of infants reported as developing cyanosis and other signs and symptoms as a result of using waters of varying nitrate content is rapidly mounting since the relationship was first established (4). Extensive nitrate-content surveys of well waters have been made (5, 6, 3) and there is a tendency to assume a degree of safety from a single negative determination. Records of seasonal or serial determinations on the same well waters have not been noted in the literature.

Because signs and symptoms of nitrate poisoning appeared in two infants of the Edmonton Rural Health Unit and subsided when water known to be free of nitrate was used in their formulas, analyses of well waters they had first used (wells no. 1 and no. 2) were made. Well no. 3 was chosen as a control because it was free of nitrate. Wells no. 1 and no. 3 are one half mile apart and both are about ten miles from well no. 2. Theoretical considerations led to the decision to have periodic analyses made on the waters of all three wells, with the results as shown below. The analyses were made by the Industrial Laboratory, University of Alberta, in Edmonton.

Well Number	Details	Date of Sample	Nitrate Level p.p.m.
1	Depth 85 feet. Bored and drilled. Faulty cribbing. Contamination likely in summer.	Aug. 22, 1949	13.4
		Nov. 3, 1949	5.2
		Dec. 7, 1949	2.0
		Dec. 29, 1949	3.2
2	Depth 24 feet. Dug. Alfalfa grown in the field alongside. Contamination possible in summer.	Nov. 30, 1949	60.0
		Dec. 23, 1949	34.9
3	Depth 50 feet. Bored. Wooden cribbing. Trees alongside. Contamination appears unlikely.	Nov. 3, 1949	00.0
		Dec. 29, 1949	38.0
		Jan. 6, 1950	53.2

The marked fluctuation of nitrate levels noted raises the question of the value of single determinations. It would seem that a single negative report is of doubtful significance.

Contamination with excreta and other organic matter has been cited as responsible for high nitrate levels (5, 6, 1). In the present instance, sub-zero weather had prevailed for weeks before the last analysis and bacterial action should have been at a standstill, yet well no. 3 showed its highest nitrate level in the last report. It was also the one least subject to contamination in our opinion. Possibly other sources of high nitrate content should be considered, as has been suggested (5).

Mineral nitrate deposits, though not common, occur in various areas of this continent (7) and have been noted in shale beds in Alberta (8). It is possible that they are leached into wells in some instances.

Probably more important would be conditions in surrounding fields. The literature indicates marked fluctuations in nitrate production in field soils, depending upon the crops grown, crop sequence, fallowing, moisture conditions, the depth of soil from which samples are taken, temperature and seasons (9, 10). There is also considerable variation in nitrate production from year to year (11). With all these possibilities present, the postulation of contamination with sewage or excreta is probably not necessary. This would appear so, especially in those instances where high nitrate levels existed in the absence of coliform bacilli (6).

Unusually dry seasons, such as the fall of 1949 in the Edmonton area with unusually low ground water tables, might promote the leaching out of nitrates from soil strata that usually do not contribute much of the water collecting in shallow wells. Reduced water content in the soil would also tend toward higher nitrate levels because of lesser dilution.

If single determinations of nitrate content are not to be depended upon, the economy and usefulness of extensive surveys need to be reassessed.

#### RÉSUMÉ

Repeated analyses of well waters show marked fluctuations in nitrate content over a short period of time. The improbability of recent contamination of these wells with organic matter in sub-zero weather is indicated. Other factors influencing nitrate levels of well waters are suggested.

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## THE IDENTIFICATION OF SALMONELLA STRAINS

THERE is increasing interest in the study of Salmonella strains in keeping with the expansion of our knowledge concerning the occurrence of Salmonella infections in man. Bacteriological studies have indicated that strains of Salmonella are present and cause infection in man much more frequently than was previously believed. Salmonella strains are present in man and animals, and all strains are potentially pathogenic for both. In man, Salmonellosis includes Salmonella fever in which *S. typhi*, the paratyphoid bacilli, and certain other strains are frequently associated; *Salmonella septicaemia*, in which *S. cholerae-suis* is frequently found; *Salmonella enterocolitis*, from which condition a number of strains have been isolated; and localized infections such as salpingitis, otitis, pneumonia and cholecystitis or osteomyelitis. Some types are more adapted to man, while others are isolated usually from animals. About one hundred and sixty types have been described. The determination of the type is of epidemiological importance.

To Dr. F. Kauffmann, of the Danish State Serum Institute in Copenhagen, is due the credit for introducing a classification of Salmonella in 1934, in collaboration with Dr. P. White. Dr. Kauffmann made available specific sera for typing strains and encouraged leading bacteriologists in various countries who were interested in this field to co-operate with him in collecting and identifying Salmonella strains. New strains were constantly being found, and without the services of Dr. Kauffmann widespread confusion would have resulted. Strains isolated in one country which were obviously different from any isolated there previously would have been considered entirely new if Dr. Kauffmann had not been able to collect strains from many countries and undertake to determine if they had already been described. In November, 1937, following a proposal made by a body of experts who met under the auspices of the Health Organization of the League of Nations, an International Salmonella Centre was established in Copenhagen. During its first three years the Centre was financed by the Commonwealth Fund, New York. The work has been carried forward, and its importance was again officially recognized in 1948 when the World Health Organization established a World Salmonella Centre in Dr. Kauffmann's laboratories.

In Canada, organized efforts to collect and identify *Salmonella* strains date back to 1935 when the Laboratory Section of the Canadian Public Health Association appointed a committee under the chairmanship of Dr. M. H. Brown to study the types of *Salmonella* strains obtained in provincial, municipal, and hospital laboratories. The laboratory work was done under the direction of Dr. D. T. Fraser and Dr. James Craigie in the Connaught Medical Research Laboratories, and in the Western Division of the Laboratories at the University of British Columbia under the direction of Dr. C. E. Dolman. During 1937, 544 strains were studied by the committee. In 1938, following the establishment of the International *Salmonella* Centre at Copenhagen, national *Salmonella* centres, affiliated with the International Centre, were set up in various countries, and a centre for Canada was established in the Connaught Medical Research Laboratories under the direction of Dr. Craigie. On Dr. Craigie's return to Great Britain in 1946, the work was continued in the Western Division of the Laboratories by Dr. Dolman, who for many years had been conducting important work in the field of food infections, including the study of *Salmonella* strains. In 1947 Dolman and Ranta reported the results of two years of post-war operation of the typing centre. Their findings brought to 37 the number of types identified in Canada and they recorded three types isolated for the first time in North America, as well as two types which had not been previously reported pathogenic for man.

Important work in the *Salmonella* field has been conducted in other Canadian laboratories. For more than ten years, Miss Vera Crossley, B.A., has been engaged in the study of strains in the laboratories of the Department of Health of Ontario. She has identified many strains and has published a series of valuable papers. It is gratifying that Dr. Kauffmann, on behalf of the World *Salmonella* Centre, recently officially recognized Miss Crossley's work. This is a well-deserved tribute to the contribution which she has made.

Following a consideration of the *Salmonella* problem in Canada by a conference of provincial laboratory directors, and at their request, a National *Salmonella* Typing Centre has been established at the Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.

The classification of *Salmonella* utilizing the Kauffmann-White schema is becoming increasingly complex as new types are being recognized in many countries. By agreement, new types are designated by the name of the place from which the strain was reported. Dolman et al. recently recorded the isolation of *S. vancouver*, stating that it was the first new type to be isolated in Canada. The United States Public Health Service has just published descriptions of eight new *Salmonella* types, three of which were from human cases and the others from cats, dogs, and hens.

Another approach to a classification of *Salmonella* was suggested by Craigie following the introduction of the typing of *S. typhi* using specific bacteriophages. The value of bacteriophage typing of *S. typhi* has been thoroughly established. It has proved to be an important epidemiological tool, and in Great Britain and Europe it is in everyday use as an essential part of the control of enteric infections.

Substantial progress has been made also in the study of paratyphoid strains, particularly *S. schottmuelleri*. In Canada, Desranleau and Martin recently summarized their work, using bacteriophage typing, in the Province of Quebec where, since 1944, they have examined 520 cultures of *S. schottmuelleri* from 277 persons. In the past nine years, 5,295 cultures of *S. typhi* from 2,549 persons have been examined, using bacteriophage typing.

As a result of studies in a number of laboratory centres, further advances are to be expected, and ultimately a much less complex classification of *Salmonella* may be made possible.

#### ANOTHER MILESTONE IN THE DEVELOPMENT OF PUBLIC HEALTH IN CANADA

ON JUNE 12TH to 14th the thirty-eighth annual meeting of the Canadian Public Health Association will be held in Toronto. This in itself is an important event, but it will also be the occasion for the first meeting of the Ontario Public Health Association.

Of fundamental importance in the maintenance of a strong national organization of professional workers in public health is the development of provincial or regional public health associations. An outstanding problem in the functioning of the Canadian Public Health Association over the years has been one of geography. To serve the ten Provinces, the national meeting must be held in turn in the eastern, central, and western areas. This of necessity means that there are long intervals between meetings in the various Provinces. An active and effective provincial public health association is the answer. This is being demonstrated by the Canadian Medical Association, membership in whose provincial divisions carries with it membership in the national organization. An annual meeting, held by each provincial division, provides continuity and makes possible the active participation of the members in the work. The formation of the Ontario Public Health Association, bringing together medical officers of health, public health engineers, laboratory personnel, veterinarians, nurses and sanitary inspectors, constitutes an important milestone in the development of the Canadian Public Health Association's national work.

It is of interest that probably the earliest public health association in Canada was the Ontario Health Officers Association. In the *Sanitary Journal* of 1886 there is reference to the first meeting, in Lindsay, Ontario, of a body so designated. It is recorded that more than one hundred physicians were in attendance. Although the Ontario Health Officers Association as then organized ceased to function within a few years, it was re-established in 1912 and has made an important contribution to public health in Ontario. The incorporation of the Ontario Public Health Association, providing membership for all professionally engaged in public health in the Province, and for representatives of boards of health, has been made possible through the deliberations of a committee of the Ontario Health Officers Association during the past three years, and great credit for the successful completion of the plans is due Dr. L. A. Pequegnat and the members of the Board of Directors.

**THIRTY-EIGHTH ANNUAL MEETING  
CANADIAN PUBLIC HEALTH ASSOCIATION  
FIRST MEETING  
ONTARIO PUBLIC HEALTH ASSOCIATION**

*King Edward Hotel, Toronto*

**JUNE 12-14, 1950**

**DIRECTORY OF SESSIONS**

All meetings will be held in the King Edward Hotel. The morning sessions will begin at 9.30 (except on Monday), the luncheon sessions at 12.45, the afternoon sessions at 2.30, and the dinner session at 7.00.

**MONDAY, JUNE 12**

- 9.00 a.m.—Registration. Every delegate is expected to register.  
The fee for everyone (except wives of members) is \$2.00.
- 10.00 a.m.—Ontario Public Health Association: Minister's Conference (for Ontario Health Officers).
- 12.45 p.m.—Canadian Public Health Association and Ontario Public Health Association: Luncheon.
- 2.30 p.m.—Canadian Public Health Association and Ontario Public Health Association: First General Session.
- 6.00 p.m.—Ontario Public Health Association: Dinner and Business Meeting, Board of Directors.
- 7.45 p.m.—Canadian Public Health Association: Meeting of Executive Council.

NOTE: There will be meetings of committees of the Vital Statistics Section and a meeting of the Section Council at a time to be announced in the final program.

**TUESDAY, JUNE 13**

- 9.30 a.m.—Canadian Public Health Association and Ontario Public Health Association: Section Meetings—  
**Public Health Administration.**  
**Public Health Nursing.**  
**Sanitation.**  
**Venereal Disease Control.**  
**Vital Statistics.**
- 2.30 p.m.—Canadian Public Health Association and Ontario Public Health Association: Second General Session.
- 3.30 p.m.—Canadian Public Health Association and Ontario Public Health Association: Tea for ladies. Dufferin Division, Connaught Medical Research Laboratories.
- 7.00 p.m.—Canadian Public Health Association and Ontario Public Health Association: Annual Dinner.

### WEDNESDAY, JUNE 14

9.30 a.m.—Canadian Public Health Association and Ontario Public Health Association:  
Section Meetings—

**Epidemiology.**  
**Public Health Administration.**  
**Public Health Education.**  
**Sanitation.**  
**Vital Statistics.**

12.45 p.m. Canadian Public Health Association and Ontario Public Health Association:  
Luncheon.

2.30 p.m.—Canadian Public Health Association and Ontario Public Health Association:  
Special Session.

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## TENTATIVE PROGRAM

MONDAY, JUNE 12, 9.00 a.m.

### REGISTRATION

All delegates are expected to register. The fee is \$2.00 for everyone except wives of members.

Tickets for the luncheons and the annual dinner will be available at the Registration Desk, Crystal Ballroom foyer.

Standard Convention Certificates, entitling delegates to purchase return rail fares, should be presented at the Registration Desk immediately on arrival, with the validation fee of 25 cents charged by the Canadian Passenger Association. Certificates received at the Desk after 12 o'clock noon on Tuesday, June 13th, will NOT be acceptable for validation.

MONDAY, 10.00 a.m.

### ONTARIO PUBLIC HEALTH ASSOCIATION

#### MINISTER'S CONFERENCE for ONTARIO HEALTH OFFICERS

Presiding: GORDON P. JACKSON, M.B., D.P.H., Medical Officer of Health, City of Toronto, and President, Ontario Public Health Association.

**Address of Welcome:** THE HONOURABLE WILLIAM A. GOODFELLOW, Acting Minister of Health and Hospitals, Province of Ontario.

**Recent Changes in Health Legislation.**

**Open Discussion of Current Problems.**

**Appointment of Committees on Nominations and Resolutions.**

**MONDAY, 12.45 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Luncheon**

**Presiding:** GORDON P. JACKSON, M.B., D.P.H., Medical Officer of Health, City of Toronto, and President, Ontario Public Health Association.

**Speaker:** THE HONOURABLE WILLIAM A. GOODFELLOW  
Acting Minister of Health and Hospitals  
Province of Ontario

**MONDAY, 2.30 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**First General Session**

**Presiding:** J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President, Canadian Public Health Association.

**Presidential Address.**

GORDON P. JACKSON, M.B., D.P.H., Medical Officer of Health, City of Toronto, and President, Ontario Public Health Association.

**The Relationship of the Census to Public Health.**

HERBERT MARSHALL, B.A., F.S.S., Dominion Statistician, Dominion Bureau of Statistics, Ottawa.

**Some Problems in the Education of Public Health Personnel.**

M. R. KINDE, M.D., Director, Division of Public Health, The W. K. Kellogg Foundation, Battle Creek.

**Health of the Mouth as influenced by the Consistency of Food.**

C. H. M. WILLIAMS, D.D.S., B.Sc. (Dent.), Professor of Periodontology, Faculty of Dentistry, University of Toronto.

**Prepaid Medical Care under Government Auspices in Saskatchewan.**

F. D. MOTT, M.D., Acting Deputy Minister of Public Health, Department of Public Health of Saskatchewan, Regina.

**Prepaid Medical-Care Programs in Ontario.**

W. B. STIVER, M.D., D.P.H., Medical Director, Physicians' Services Incorporated, Toronto.

**MONDAY, 6.00 p.m.**

**ONTARIO PUBLIC HEALTH ASSOCIATION**

**Dinner and Business Meeting**

**Board of Directors**

**Presiding:** GORDON P. JACKSON, M.B., D.P.H., Medical Officer of Health, City of Toronto, and President of the Association.

**MONDAY, 7.45 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION**

**Meeting of Executive Council**

Presiding: J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President of the Association.

**TUESDAY, JUNE 13, 9.30 a.m.**

**PUBLIC HEALTH ADMINISTRATION SECTION**

Presiding: D. S. PUFFER, M.B., D.P.H., Assistant to the Chief Medical Officer of Health, Province of Ontario, and Chairman of the Section.

**Public Health Attitudes.**

L. A. PEQUEGNAT, M.B., D.P.H., Deputy Medical Officer of Health, City of Toronto.

**The Layman in the Field of Public Health Administration.**

J. C. RUTLEDGE, B.Comm., Chief, Personnel Division, Administration Branch, Department of National Health and Welfare, Ottawa.

**The Development of a Cardiac Register. (Slides.)**

J. H. GARDINER, M.D., Hospital for Sick Children, Toronto.

**The Production and Use of BCG. (Colored film.)**

M. H. BROWN, M.D., D.P.H., Connaught Medical Research Laboratories and School of Hygiene, University of Toronto.

**Education of Health Workers Looks Today across National Boundary Lines.**

HENRY R. O'BRIEN, M.D., Chief, Office of International Health Relations, United States Public Health Service, Washington.

**Some Aspects of the Organization of Public Health Laboratory Services.**

JAMES GIBBARD, B.S.A., M.Sc., Chief, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.

**The Certification of Physicians in the Specialty of Public Health.**

JAMES H. BAILLIE, M.D., D.P.H., Assistant Medical Director, The Bell Telephone Company of Canada, Toronto.

**TUESDAY, 9.30 a.m.**

**PUBLIC HEALTH NURSING SECTION**

Presiding: MISS HELEN CARPENTER, Lecturer, School of Nursing, University of Toronto, and Chairman of the Section.

**1. Business Session.**

**2. Panel Discussion:** Report of the Study Committee on Public Health Practice, Canadian Public Health Association.

Chairman: MISS CARPENTER.

**Participants:**

MISS F. H. M. EMORY, Associate Director, School of Nursing, University of Toronto.

MISS BRIGITTE LALIBERTE, Chief Nurse, Nursing Section, Department of Health of Montreal.

MISS CHRISTINE LIVINGSTON, Chief Superintendent, Victorian Order of Nurses for Canada, Ottawa.

MISS RUTH MCCLURE, Supervisor of Public Health Nursing, Edmonton Rural Health Unit, Alberta.

MISS EDNA L. MOORE, Director, Division of Public Health Nursing, Department of Health of Ontario, Toronto.

MISS DOROTHY M. PERCY, Chief Supervisor of Nurses, Department of National Health and Welfare, Ottawa.

**TUESDAY, 9.30 a.m.**

#### **SANITATION SECTION**

Presiding: A. E. BERRY, C.E., M.A.Sc., Ph.D., Director, Division of Sanitary Engineering, Department of Health of Ontario, and Chairman of the Section.

##### **Health Aspects of Housing Regulations.**

A. E. BERRY, C.E., M.A.Sc., Ph.D., Director, Division of Sanitary Engineering, Department of Health of Ontario, Toronto.

##### **Environmental Sanitation.**

J. R. MENZIES, B.A. Sc., O.L.S., Chief, Public Health Engineering Division, Department of National Health and Welfare, Ottawa.

##### **Newer Industrial Health Problems Presented by the Introduction of Radio-active Substances.**

H. G. GUEST, M.D., Division of Industrial Health, Department of National Health and Welfare, Ottawa.

##### **Health Problems with Newer Insecticides.**

K. KAY, Ph.D., Chief, Industrial Health Laboratory, Department of National Health and Welfare, Ottawa.

**Other papers to be announced.**

**TUESDAY, 9.30 a.m.**

#### **VENEREAL DISEASE CONTROL SECTION**

Presiding: CARL HOOKINGS, M.D., D.P.H., Division of Venereal Disease Control, Department of Health of Ontario, and Chairman of the Section.

##### **Spinal-Fluid Changes in Neurosyphilis.**

JULES ARCHAMBAULT, M.D., D.P.H., Adviser and Consultant to the Division of Venereal Diseases, Ministry of Health, Province of Quebec.

##### **The Role of Epidemiology in Venereal Disease Control.**

CHARLES L. HUNT, M.D., Director, Division of Venereal Disease Control, Department of Health and Welfare of British Columbia, Vancouver.

##### **The Differential Diagnosis and Treatment of Gonorrhoea in the Male and Female.**

G. G. HATFIELD, M.D., D.P.H., Director, Division of Venereal Disease Control, Department of Health and Social Services of New Brunswick, Fredericton.

##### **The Diagnosis and Treatment of Venereal Disease.**

THEODORE ROSENTHAL, M.D., Director, Bureau of Adult Hygiene, Department of Health, New York City, and Special Consultant to the United States Public Health Service.

**TUESDAY, 9.30 a.m.**

#### **VITAL STATISTICS SECTION**

Presiding: A. H. SELLERS, M.D., D.P.H., Medical Statistician, Department of Health of Ontario, and Chairman of the Section.

**Chairman's Remarks.** DR. SELLERS.

**The Comparative Mortality Index as Applied to Cancer Mortality in Canada.**

J. WYLLIE, M.D., D.P.H., Professor of Preventive Medicine, Queen's University, Kingston.

**Mortality in Terms of Lost Years of Life.**

J. DOUGHTY, M.A., Director of Vital Statistics, Department of Health and Welfare of British Columbia, Victoria.

**Traffic Accident Investigation—The Next Phase.**

N. L. BURNETTE, Sc.D., Assistant Vice-President, Metropolitan Life Insurance Company, Ottawa.

**The Personal Factor in Accidents.**

G. E. HOBBS, M.D., Professor of Clinical Preventive Medicine, The University of Western Ontario, London.

**Business Session.**

**TUESDAY, 2.30 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Second General Session**

Presiding: GORDON P. JACKSON, M.B., D.P.H., Medical Officer of Health, City of Toronto, and President, Ontario Public Health Association.

**Presidential Address.**

J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President, Canadian Public Health Association.

**Veterinary Public Health Aspects of Communicable Disease Control.**

JAMES H. STEELE, V.S., Chief, Veterinary Public Health Services, United States Public Health Service, Communicable Disease Center, Atlanta, Ga.

**Reasons for the Decline in Venereal Disease Incidence.**

THEODORE ROSENTHAL, M.D., Director, Bureau of Adult Hygiene, Department of Health, New York City, and Special Consultant to the United States Public Health Service.

**What Is Involved in the Improvement of Nursing.**

MARION W. SHEAHAN, R.N., New York, Director of Programs, Committee for Improvement of Nursing Services, National Nursing Council, U.S.A.

**Co-ordination in Nutrition Education.**

RUTH E. MOYLE, Nutritionist, Department of Public Health, City of Toronto, and Chairman, Toronto Nutrition Committee.

**TUESDAY, 3.30 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Tea for ladies at the Dufferin Division, Connaught  
Medical Research Laboratories,  
University of Toronto**

Cars will leave the King Edward Hotel at 3.30 p.m. sharp. Invitations will be available at the Registration Desk until 11.00 a.m. Tuesday.

**TUESDAY, 7.00 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Annual Dinner**

Presiding: J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President, Canadian Public Health Association.

**Address: The Unfinished Jobs of Public Health.**

REGINALD M. ATWATER, M.D.

Executive Secretary

The American Public Health Association, New York.

Tickets will be on sale at the Registration Desk from 9.00 a.m. Monday until 5.00 p.m. Tuesday.

**They will not be on sale at the door.**

**WEDNESDAY, JUNE 14, 9.30 a.m.**

**EPIDEMIOLOGY SECTION**

Presiding: D. R. E. MACLEOD, M.D., D.P.H., Connaught Medical Research Laboratories and School of Hygiene, University of Toronto.

**A Study of Premature Births in the Greater Vancouver Area.**

STEWART MURRAY, M.D., D.P.H., Senior Medical Health Officer, Metropolitan Health Committee, Vancouver, B.C.

**Results of the Tuberculin Patch Test in 2,354 Toronto Kindergarten Children.**

A. E. YOUNG, M.D., D.P.H., Director, Tuberculosis Prevention Division, Department of Public Health, City of Toronto.

**Relationship between Maternal and Infant Diphtheria Antitoxin Levels in the First Year of Life.**

V. J. FREEMAN, M.D., Department of Public Health and Preventive Medicine, University of Washington, Seattle.

**Title to be announced.**

N. E. MCKINNON, M.B., School of Hygiene and Connaught Medical Research Laboratories, University of Toronto.

**Infectious Hepatitis in Army Installations in the Kingston Area.**

R. M. BARRON, Major, R.C.A.M.C., Hygiene Officer, Central Ontario Command, Oakville, Ont.

**WEDNESDAY, 9.30 a.m.**

**PUBLIC HEALTH ADMINISTRATION SECTION**

Presiding: D. S. PUFFER, M.B., D.P.H., Assistant to the Chief Medical Officer of Health, Province of Ontario, and Chairman of the Section.

**1. The Progress of the National Health Grants.**

MARCEL LANGLOIS, M.D., Assistant Director of Health Insurance Studies, Department of National Health and Welfare, Ottawa.

**2. Symposium on Provincial and Local Administrative Policies.**

Chairman: M. R. ELLIOTT, Director, Extension Health Services, Department of Health and Public Welfare of Manitoba, Winnipeg.

**Participants:**

G. F. AMYOT, M.D., D.P.H., Deputy Minister of Public Health and Provincial Health Officer, Department of Health and Welfare of British Columbia, Victoria.

A. R. J. BOYD, M.D., C.M., D.P.H., Medical Officer of Health, Kingston, Ontario.

- A. M. CLARKE, M.D., D.P.H., Director of Health Planning Services, Department of Health and Social Services of New Brunswick, Fredericton.
- J. M. HERSHEY, Ph.D., M.D., D.P.H., Assistant Deputy Minister of Public Health and Director of Regional Health Services, Department of Public Health of Saskatchewan, Regina.
- JAMES MCGRATH, M.D., Assistant Deputy Minister, Department of Public Health of Newfoundland, St. John's.
- J. S. ROBERTSON, M.D., D.P.H., Assistant Deputy Minister, Department of Public Health of Nova Scotia, Halifax.
- A. SOMERVILLE, M.D., D.P.H., Assistant Deputy Minister, Department of Public Health of Alberta, Edmonton.
3. **Business Session. Election of officers for 1950-1951.**

**WEDNESDAY, 9.30 a.m.**

**PUBLIC HEALTH EDUCATION SECTION**

Presiding: CHRISTIAN SMITH, Director, Division on Public Relations, Canadian Mental Health Association, Toronto.

**Panel Discussion:** Health Education and the Local Health Department.

**WEDNESDAY, 9.30 a.m.**

**SANITATION SECTION**

Presiding: A. E. BERRY, C.E., M.A.Sc., Ph.D., Director, Division of Sanitary Engineering, Department of Health of Ontario, and Chairman of the Section.

**The New Plumbing Code in Ontario.** DR. BERRY.

**The Installation of Septic Tanks and Wells.**

C. S. HUBAND, C.S.I.(C.), Secretary, Local Board of Health, Ottawa.

**Sanitation in a Flooded Area.**

L. A. KAY, C.E., Provincial Sanitary Engineer, Department of Health and Public Welfare, of Manitoba, Winnipeg.

**Other papers to be announced.**

**Business. Election of officers for 1950-1951.**

**WEDNESDAY, 9.30 a.m.**

**VITAL STATISTICS SECTION**

Presiding: A. H. SELLERS, M.D., D.P.H., Medical Statistician, Department of Health of Ontario, and Chairman of the Section.

**An Interim Report on the East York—Leaside Sickness Survey.**

R. P. SMITH, M.D., D.P.H., Assistant Medical Officer of Health, East York-Leaside Health Unit, Ontario.

**Sampling Techniques—Their Application to Health Statistics.**

D. K. DALE, B.A., Research and Development Division, Dominion Bureau of Statistics, Ottawa.

**The Collection and Utilization of Morbidity Data in Industry.**

A. H. SELLERS, M.D., D.P.H., R. B. SUTHERLAND, M.D., D.P.H., W. H. BISHOP, and W. B. MARR, Department of Health of Ontario, Toronto.

**Methods Used in the Province of Saskatchewan to Provide Vital Statistics Information to Medical Officers of Health.**

W. C. N. REED, Phm.B., Director of Vital Statistics, Department of Public Health of Saskatchewan, Regina.

**Vital Statistics and the Medical Officer of Health.**

J. M. MATHER, M.D., D.P.H., Director, Halton County Health Unit, Milton, Ontario.  
**Title to be announced.**

G. R. WALTON, M.B., D.P.H., Medical Health Officer, Regina, Saskatchewan.

**WEDNESDAY, 12.45 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Luncheon**

Presiding: J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President, Canadian Public Health Association.

**Address: Population Problems**

B. K. SANDWELL, Esq.

Editor-in-Chief, "Saturday Night"

Toronto

**WEDNESDAY, 2.30 p.m.**

**CANADIAN PUBLIC HEALTH ASSOCIATION  
AND  
ONTARIO PUBLIC HEALTH ASSOCIATION**

**Special Session**

Presiding: J. T. PHAIR, M.B., D.P.H., Deputy Minister of Health and Hospitals, Province of Ontario, and President, Canadian Public Health Association.

**Cortisone and ACTH.**

R. F. FARQUHARSON, M.D., Professor of Medicine, University of Toronto.

**Newer Developments in Cortisone.**

JAMES M. CARLISLE, M.D., Medical Director, Merck & Co., Rahway, N.J.

**Newer Developments in ACTH.**

JOHN R. MOTE, M.D., Medical Director, The Armour Laboratories, Armour & Company, Chicago.

**Coxsackie Virus and Poliomyelitis:**

**Clinical and Laboratory Aspects:** A. J. RHODES, M.D., F.R.C.P.(Edin.)<sup>1</sup>; L. N. SILVERTHORNE, M.B.<sup>2</sup>; M. PATRICIA ARMSTRONG, M.D.<sup>2</sup>; F. H. WILSON, M.D., D.P.H.<sup>2</sup>; and EINA M. CLARK, B.Sc., M.A.<sup>1</sup>

**Pathological Features:** W. L. DONOHUE, M.A., M.D.<sup>4</sup>, and R. C. RITCHIE, M.D.<sup>4</sup>

<sup>1</sup>Connaught Medical Research Laboratories, University of Toronto. <sup>2</sup>Wards and Laboratories of the Hospital for Sick Children, Toronto, and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P.(Lond.) <sup>3</sup>Director, Dufferin County Health Unit, Shelburne, Ont. <sup>4</sup>Department of Pathology, Hospital for Sick Children, and the Department of Pathology, University of Toronto.

